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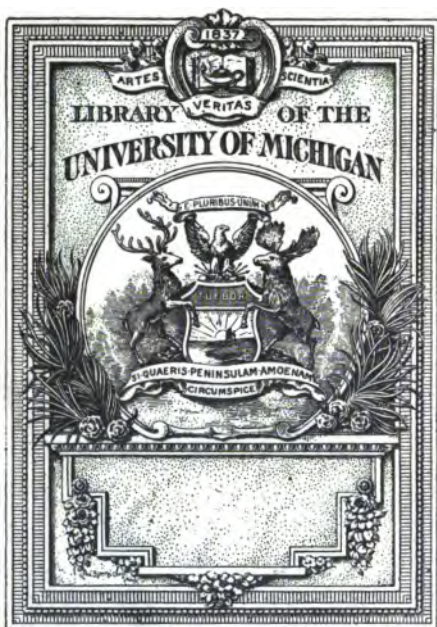
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MAKING A WATER GARDEN

THE
HOUSE & GARDEN
MAKING
BOOKS

IT is the intention of the publishers to make this series of little volumes, of which *Making a Water Garden* is one, a complete library of authoritative and well illustrated handbooks dealing with the activities of the home-maker and amateur gardener. Text, pictures and diagrams will, in each respective book, aim to make perfectly clear the possibility of having, and the means of having, some of the more important features of a modern country or suburban home. Among the titles already issued or planned for early publication are the following: *Making a Rose Garden; Making a Lawn; Making a Tennis Court; Making a Fireplace; Making Paths and Driveways; Making a Poultry House; Making a Garden with Hotbed and Coldframe; Making Built-in Furniture; Making a Rock Garden; Making a Garden to Bloom this Year; Making a Garden of Perennials; Making the Grounds Attractive with Shrubbery; Making a Bulb Garden, Making a Garage, Making and Furnishing Outdoor Rooms and Porches*; with others to be announced later.





A well arranged and very effective small pool of hardy water lilies, with rushes and grasses on the margin

Making a Water Garden

By WILLIAM TRICKER

AUTHOR OF
THE WATER GARDEN



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THE ILLUSTRATIONS

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Making a Water Garden

SPECIES AND VARIETIES OF WATER LILIES

A WATER garden may be of large dimensions covering many acres of natural ponds, bogs and swamps, where water lilies, Egyptian and Japanese lotus, bloom together with all the varied species of bog and aquatic plants both native and exotic. Such a garden can only be constructed and maintained at a great cost and only a few of our large public parks and gardens make the effort, but are content with a smaller work and a display of the various water lilies in artificial ponds. These, however, are so

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attractive that almost everyone has the desire to produce such charming effects in his own garden. Hence the average water garden is of moderate dimensions and in many instances consists only of a few tubs.

Water lilies are universally known as they are indigenous to all sections of the globe, the temperate and tropical sections each claiming its own distinctive species. The native water lilies of the United States, with the exception of the southern, are white and of these there are many distinct varieties, usually found in large ponds and margins of lakes — only one form in a single pond or locality however.

In Europe, or through the temperate zone, the majority of species are very

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similar, most of them being white. One notable exception is the Swedish pink lily. These, while similar in color of flower and leaf, differ much in root or rhizome. The American is of a running or rambling nature with many tubers in some instances, and of a soft or spongy texture; the European has a solid rhizome with few side shoots, no tubers and produces flowers from a more compact crown. These and the many hybrids are classed as hardy.

The water lilies of the southern states and South America are yellow and white.

With the yellow Mexican lily and the Swedish pink lily the hybridization has given to the world many beautiful flowers blending pink and yellow. In many flowers the color is more intensified and we

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have flowers ranging from pink to carmine and rosy crimson and bright garnet, while on the other hand we have pure yellow and yellow with pink and red shading to orange red. These too are all perfectly hardy, but as they all grow in water from two to four or more feet deep they are below the freezing line. I would not say they are frost proof. I have known ponds where by some accident or otherwise the water has been drawn off, and the roots were frozen and killed. I would advise that the valuable hybrids be not exposed to freezing conditions. The exception in this case is the hardy water lily, *Nymphaea pygmæa*. This I understand is hardy in Siberia and I have known roots of this to be frozen and live.

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The Swedish lily, *N. Caspary* or *alba-rosea*, is a cold-water lily and will not endure our hot summers; but another exception, this species is quite at home in one or two places in northern New York State where the water is cold in summer. Another peculiarity; our eastern lilies will not thrive or continue any length of time in the southern states; they require a winter's rest.

The Indian water lilies flower only at night for they cannot endure our noon-day sun. The flowers open at sunset and close early next day if it is bright. Most of these lilies are red and white but here again through the hybridist's art the range of color is greatly extended and we have flowers from a soft pink to deep red and maroon to bright crimson.

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The African species are mostly blue as are the Australian and those from Zanzibar. These are day-blooming and a valuable class of water lilies. They are of easy culture, very free flowering and useful for cut flowers and very fragrant. The Zanzibar lily has red in its composition and seedlings are sometimes red. These are beautiful flowers and with the Mexican white, *N. gracilis*, the only white day-flowering species (in cultivation or worth cultivating) we have three colors not met with in the other classes — a red, white and blue. These are known as tender varieties but are wintered indoors in a dormant condition. With trifling care there is no reason why this large collection of water lilies from all parts of the world may not be grown in part, if not all



A good example of natural planting may be seen in the lake at Bronx Botanical Garden, New York. These are hardy nymphæas of the *marliacea* type

1990

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of them, out of doors in summer in all sections of the United States.

The early varieties of the hardy nymphæas commence flowering in April and continue until midsummer. The tender varieties commence flowering in June and continue until frost, making a long and continuous season unequaled by any other class.

Water lilies as cut flowers are valuable for decorative purposes especially the tender varieties. All water lilies of the temperate zone with one or two exceptions have floating flowers; that is, they rest or float on the surface of the water. These are beautiful flowers for shallow dishes or bowls. The many varieties of *Nelumbium* or lotus, though classed as hardy aquatic plants, are in a class by

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themselves. These produce flowers on tall stems four or more feet high and are amongst the choicest of aquatic plants and are worthy of culture for cut flowers. Ancient history has much to say of the sacred lotus flowers and the flowers are held in the highest esteem by people of the Orient. Still more remarkable are the water lilies of Africa. With the many new hybrids, flowers are produced on stout stems eighteen to twenty-four inches high, standing clear of the water, strong and rigid. These are best adapted for vases and different usages. The Indian varieties are equally if not more serviceable as they open their flowers at night and remain open until nearly noon the following day. What is more, the beauty of the flowers seems to be en-

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hanced by artificial light whereas the African, being day bloomers, close at night, besides blue flowers are not good colors under artificial light.

CONDITIONS FOR GROWING WATER LILIES

WATER lilies grow naturally in ponds, usually in low ground where the washing of fine soil, silt and humus accumulates what may be considered rich soil and plenty of it. Most ponds to hold water must have a stiff, retentive clayey bottom or subsoil. From this we may infer that under artificial conditions a rich soil is imperative for the plants to grow in. On this point many failures may be recorded. I have seen many plants starved to death in artificial ponds, where, had the plants had ample root room they would have been a grand success. The best kind of soil is a loamy

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sod composted with cow manure. What would be considered good soil is good for water lilies; if such is not at hand use the next best to be procured. Do not use fresh manure; it will cause fermentation. Peat or leaf-mold—except with heavy soil or even mud from an old pond—is not desirable either. Soil that is inclined to be heavy and rich in humus is the proper kind to use. For fertilizer, well rotted cow manure gives best results and where such manure is not at hand the commercial sheep and cow manure may be used, but not as freely as the other—say one part to four; the other, one to three.

As to the quantity of soil for a single plant, I should recommend four to ten cubic feet. The hardy varieties are not

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as vigorous as the tender varieties and for one plant of tender kinds I should use a box about 8x4x1 feet—a trifle smaller if surface space is limited. Where a specimen plant can be grown it will easily cover one hundred square feet, but smaller plants in smaller boxes give excellent results for general purposes.

The hardy nymphæas may be planted in April, provided the season is not late. The season should be a little advanced so as to assure immediate growth, otherwise mutilated roots are liable to decay, but they may be planted any time during the growing season until August. It is not safe to plant nelumbiums before May and if the season is cold and late do not plant before the 15th of May. If for any purpose planting be deferred later,

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use pot grown plants which may be set out in June and July.

The hardy nymphæas may be planted from the middle of May to the middle of June, according to locality and condition of the season. In the neighborhood of New York the end of May is about right; with Victorias the end of June in unheated ponds.

One great mistake made by the amateur is in attempting to grow too many plants in a small pond or pool. The plants usually at planting time are small, very small to some people's ideas, but all the tender nymphæas are tropical and few realize what tropical vegetation is. The plants should have ample root space and abundance of rich soil and where there is sufficient space for leaf development

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the box for soil should be of corresponding size or space. Thus a tender nymphæa that will cover from 50 to 75 square feet of water surface requires from 9 to 10 cubic feet of rich loamy soil and a box 3'x3'x1' will suffice for one plant. Anything smaller than this means a smaller plant and smaller flowers.

Have boxes, tubs or other receptacles filled with soil, surfaced with sand, fine or coarse, and water about four or six inches over the top of the box and warmed by action of sun a few days previous to planting. Have everything in readiness to facilitate planting when plants are ready.

For the amateur who has but a small garden and wants to start a water garden, a few tubs make a very satisfactory



A concrete pool well set in a formal garden and adapted for hardy and tender nymphæas and victoria. Plants of lotus and papyrus in the corners would make it an ideal water garden

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beginning. Select a sunny spot and if possible have something for a background, tall plants or shrubs. Place the tubs in two rows, three in back and two in front, intercepting each other. Fill the tubs two-thirds full of good soil as before recommended, covering with sand and filling with water. The tubs should be sunken in the ground and the space between tubs planted with some moisture loving plants such as parrot's feather and a few *cyperus alternifolius* in the rear. The middle tub in back row may be planted with a nelumbium, being tall, and the rest with nymphæas. Suitable plants for tubs and small basins will be found on page 22. A concrete basin will be found more durable and not expensive and preferable to tubs, and can

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be made any size to suit requirements.

Select a spot as advised for tubs, either oval, circular or oblong, excavate to about 28 inches. In some cases the soil taken out can be used to build up around the spot. Make the sides smooth, slightly slanting outward. Make a form in one piece or sections and firmly secure around the sides, leaving a space not less than four inches for concrete, the latter to be reinforced with strong chicken wire or other wire netting or iron lathing. Arrange the netting in place so as to be in the middle of the wall.

The concrete should consist of the following ingredients and proportion:—

2 bags Portland cement

3 barrows of sand

5 barrows of gravel or finely
broken stone.

This work may be done by ordinary help or a local man accustomed to laying concrete walks and such work. Tanks, basins, etc., may be made any size but larger tanks should have a six or eight inch wall and be reinforced with the usual steel bars and rods as now used in concrete buildings. These are, when rightly built, water tight and frost proof and may be kept full of water in winter. The small basins as previously recommended, with walls but four inches thick, should be protected in winter.

Water lilies are sun-loving plants and should be fully exposed, though trees, shrubbery, etc., are desirable as a break

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against the prevailing winds, but these should cast no shadow on the pond or plants. Fountain basins may be planted with aquatic plants but they cannot be successfully grown with a fountain continually spouting. Where the water effect is desired omit the plants. It is unnecessary to change the water in the tubs, pools, or basins. Keep filled up as the water evaporates and do not allow a continuous stream to run with the idea of cleaning the water. Avoid a pond having a cold spring in it unless it is large enough to allow planting a distance from the spring. Water from a spring open to the action of the sun and air may be utilized for supplying or feeding ponds. What is called stagnant water is good for aquatic plants. The plants will

oxygenate the water and change an unsightly pool to a beauty spot.

Algæ will form more or less in all ponds and artificial pools but this is readily cleaned by using sulphate of copper (blue stone) in a bag placed in the water for a short time. Any solution of copper will have the same effect. In all cases where aquatic plants are grown, be sure to have gold fish in the water. This not only adds to the attraction of the pool but is the best means to eradicate the mosquito.

ALGÆ. A word of caution is advisable here. Sulphate of copper will cleanse water of algæ, but if too strong will kill young fish as well. Placed in the water in a common bag it soon dissolves and permeates the whole pond and little

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effect is seen on the plants. If, however, it is dissolved in water and sprayed on the plants with ever so fine a spray it will ruin them. Bordeaux mixture will also kill algæ but the lime will leave a white-wash effect on the plants which is not desirable. Caustic lye will have the same effect as the lime or the sulphate of copper, and the potash is beneficial as a fertilizer. Dissolve the sulphate of copper in a pail and the lye in another, then mix the two, adding water twenty-five parts. This solution will leave a dull sooty sediment on the leaves not objectionable and not injurious to the plants. Another form is copper carbon, a fine powder that may be distributed with a powder gun where only a few tubs are occupied or there is a small pond. Another

solution and perhaps the most accommodating for most purposes, used with the least trouble and probably with the best results, is an ammoniacal solution of copper. This can be bought in seed stores by the quart or larger quantities, with printed instructions for using, but these must not be followed closely. Dilute 25% more water, making the water the color of light bluing water. In this case there is the danger from the ammonia burning the leaves of the plants. Use the solution weak and repeat if necessary and the best results will be obtained and an amount of vexatious labor saved.

HARDY PLANTS FOR THE WATER GARDEN

THE following hardy nymphæas are best suited for tub culture, fountain basins and small pools.

N. Graziella — yellow changing to orange red

N. Laydekeri rosea — delicate rose pink to carmine

N. Laydekeri lilacea — rosy lilac

N. Laydekeri purpurata — rosy crimson

N. Aurora — soft rosy yellow changing to deep red

N. fulva — yellow shaded pink to orange red

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N. pygmaea — pure white

N. pygmaea var. *helvola* — yellow

Nelumbiums in variety and all
tender day-blooming nymphæas

For large ponds any other variety may be used but avoid planting the *N. tuberosa* forms among the European varieties as the former are very strong growers and will smother the moderate growers.

Besides the nymphæas best adapted for tubs some beautiful and ornamental specimens can be had by using the papyrus for a center plant or plants with *Cyperus alternifolius* interspersing. These grow about three feet high, about half the height of the papyrus, covering the lower part of the tall stalks of papy-

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rus. With parrot's feather planted in the tub there is a resultant covering at once very pleasing and graceful.

The following list gives miscellaneous aquatic plants:—

Acorus Calamus variegatus

Aponogeton distachyum

Cyperus alternifolius

C. papyrus

Jussiena longifolia

Limnanthemum (Water snowflake)

Limncharis (Water poppy)

Myriophyllum proserpinacoides

Parrot's feather)

Sagittaria in variety.

Other plants are very ornamental and desirable for tubs. The pickerel weed, *Pontederia cordata*, growing about two and a half feet high, has beautiful dark



Limnocharis Humboldtii, water poppy, has brilliant yellow flowers as large as its leaves and is very free growing, flowering continuously all summer



Nymphaea marliacea rosea is one of the best of this group, but *N. m. albida*, white; *N. m. Carnee*, pink; *N. m. chromatella*, yellow; *N. m. rosea*, rose pink; are all similar in growth

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green glossy foliage surmounted with deep blue flowers. A few plants of the calamus are also attractive. Even our native cat-tail, *Typha latifolia*, and wild rice, *Zizania aquatica*, and *Lythrum roseum*, loose strife (a beautiful plant 4 to 6 feet high producing large spikes of deep rose colored flowers in abundance), are well adapted for tub culture and should not be omitted from the water garden large or small. Sagittarias, the arrowheads, both single and double, deserve a place in every collection, but the calamus, sweet flag, and its variegated companion are indispensable. These as centerpieces for tubs with *Limnanthemums* and water hyacinths, water poppies, and parrot's feather, make an interesting adjunct to the miniature water garden and are indispensable in a large

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or moderate sized pond. Many other beautiful plants are associated with aquatics and are only seen in their best form growing in wet or moist ground. The giant reed, *Arundo donax* and *A. donax variegata*, *Eulalia* in variety, *Asclepias incarnata*, *Hibiscus Moscheutos*, swamp rose mallow, with its popular hybrids of many shades of color from white to pink, rose red and deep crimson, — *Lobelia cardinalis*, *L. syphilitica*, *Senecio livorum* with gorgeous orange-yellow flowers, *Thalictrum* in variety, not omitting the early flowering *Caltha palustris*, the marsh marigold and *Myosotis palustris*, the water forget-me-not, should be ranked as available for water gardens.

Victoria regia has long been known as

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an aquatic wonder. Novelty does not describe it. It is wonderful in size, wonderful in construction, wonderful in growth, a plant attaining leaves of wondrous proportion in about four months from seed sowing. This plant as grown is but an annual. Its leaves are five to six feet in diameter with a turned up rim of five or more inches. Then again, the under side of the leaves, stalk and flower bud is thickly set with sharp spines. *Victoria Trickeri* (*V. Cruziana*) of more recent introduction, has many characteristics of *V. Regia* but is by far the best to grow and can be grown under similar conditions as the tender nymphæas.

For a miniature water garden where only two or three tubs can be utilized, the Chinese pigmy water lily, *Nymphæa*

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tetragona and its hybrids, *N. Helvola* and *N. Laydekeri rosea*, are exquisitely choice and dainty. *N. tetragona* is a rapid growth with beautiful dark green foliage, and pure white flowers two inches across, probably the smallest water lily in existence. *N. Helvola* has a yellow flower very similar to the preceding variety but with beautifully mottled foliage. *N. Laydekeri rosea*, is another hybrid of *N. tetragona*, one of the earliest introductions, now very scarce and almost lost to cultivation. The flowers when first opening are a delicate pink with deep golden center; the second day are many shades deeper and the third day a deep rose pink. As the plant is very free flowering and usually there are flowers of different ages open the same day, it presents a



Victoria Trickeri combined with tender or tropical nymphæas and victorias well placed before a background of trees, shrubs and ornamental grasses. Such a display of water lilies can be produced easily in any section of the United States



Amoy

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novel appearance. To these may be added a blue variety (not hardy) *N. Daubiniana*, which produces miniature blue flowers at a very early stage and can be grown in a tub or half barrel. The above four varieties, white, yellow, pink and blue, form a unique set and are most desirable for tubs or a Japanese garden.

Water lilies especially adapted for medium sized ponds, natural or artificial are as follows:—

WHITE.—*Nymphæa alba candidissima* and *N. Marliacæ albida* are two of the best white varieties and hybrids of the white European species. They differ greatly from the American species, *N. Odorata* and *N. tuberosa*. They are compact in growth and not given to ramble or possess the whole pond.

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YELLOW.—*Nymphaea marliacca chromatella* is still the best of the pure yellow water lilies for most purposes. *N. odorata sulphurea* is a good yellow lily but is of a straggling growth.

YELLOW AND RED.—*N. Paul Hariot* stands foremost, a grand and magnificent flower of the largest size. It is clear yellow with delicate shadings of red at the base of petals, deepening in color succeeding days. *N. Robinsoni* is very distinctive both in form and color; petals broad at base, of a rich yellow deepening red toward the center; the stamens are rich orange red. One of the best of the yellow-red, flowering, hardy, day-blooming group.

PINK AND RED.—*N. Marliacea rosea* is the best of the pink varieties resembling

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other *Mariacea* in form, size and habit of growth. Flowers large; deep rose-pink in color. *N. William Doogue* is another choice pink water lily; flowers large, beautiful cup-shaped and of a delicate shell-pink color. *N. Gloriosa* is a nymphæa unsurpassed in its exquisite and unique color and chaste finish; flowers large, of a deep carmine rose. *N. James Brydon*, a superb variety represents the highest achievement of the American hybridist art. The flowers are uniformly large and of perfect form and finish and a rich rosy-crimson color. *N. Wm. Falconer*, another American hybrid; the most brilliant dark red hardy water lily in cultivation; of an intense bright garnet color. *N. Arethusa*. A counterpart of *N. James Brydon*, except

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in color, which is a brilliant crimson pink. The four last varieties are of American origin and are unsurpassed by any European variety.

The above twelve are the choicest varieties of hybrid hardy nymphæas embracing the largest flowers, the most distinct colors, vigorous growth, free flowering, none of which produces seed.

The following twelve nymphæas are best adapted for large ponds or lakes and should be planted in large clumps and in some instances only two or three clumps in a pond. The difference between these and the preceding twelve is that these plants have spreading roots requiring more space, and produce seed, which when ripe spreads over the whole pond and the following season the strong-

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est varieties usually possess the whole area. The prevailing colors are white and pink.

Nymphæa odorata — The common sweet scented water lily of the eastern states. White. Very desirable.

N. odorata gigantia — Large white pond-lily of mid-Atlantic states. Large and good but lacking in fragrance to *N. Odorata*. White.

N. odorata Luciana — A pure pink water lily, larger and stronger grower than *N. Odorata rosea*. The Cape Cod pink lily. Exquisitely fragrant.

N. odorata W. B. Shaw — A large rose flower, a strong grower, and where there is ample space produces an abundance of large flowers valuable for cutting purposes.

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N. odorata, *sulphurea* and *sulphurea grandiflora* — a hybrid water lily, a cross between *N. Odorata* and the Florida lily, *N. flava*, which is the yellow species. The flowers of this lily do not float but like the Florida lily stand six or eight inches above the water.

• *N. odorata* Eugenia de Land — A new water lily of recent introduction producing extra large flowers of the true odorata type, of an exquisite shade of deep rose pink of iridescent hues. Plants are very vigorous and free flowering; grand for cutting.

N. odorata, Mrs. Roche — Another novelty of the odorata type. Vigorous and free flowering; flowers standing above the water and are distinct and fine; the color is deep cerise pink, better de-



Nymphaea odorata, Eugenia de Land, is a new hybrid of deep rose pink with iridescent hues and exquisitely fragrant



Nelumbium roseum plenum is a double form with large, bright rose flowers cultivated as the Egyptian lotus

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scribed as "Helen pink." This and the preceding variety were awarded a Silver Medal as distinctive new and meritorious varieties at the Newport, R. I. Horticultural Society, September 14th, 1912.

N. tuberosa — A native species of the middle western states; a very strong grower and produces enormous large white flowers suitable only for large ponds and lakes.

N. tuberosa maxima — The name would imply that it was larger than the preceding, but a few years ago it was considered to belong to the *odorata* type, as it was found growing in the state of New Jersey, but it was found to belong to the *tuberosa* class when dug, for the rhizomes were found to have many tubers thereon. The large white flowers com-

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pare favorably with the European species, *N. alba candidissima*.

N. tuberosa rosea is a natural cross, not so strong a grower as the type; flowers pink.

N. tuberosa Richardsoni — This is one of the very best of the white flowering water lilies. The flowers are extra large, petals incurving, forming a perfect sphere when fully open; six to eight inches across. A superb variety.

N. Helen Fowler — A natural cross possessing all the good qualities of the species but with the additional good quality of having large flowers of a rich rose pink color, very fragrant and desirable for cut purposes. Certificated by the Horticultural Society of New York.

THE SELECTION OF A SITE

AS no two gardens are similarly situated, no definite instruction can be laid down, but a few points applicable in all instances may be considered. The chief necessity is water, the supply being either natural or artificial. It matters not if it is a running stream, spring water, rain water or from a city supply. One of the best sources is a small sluggish stream wending its way through a more or less level piece of ground and widening out, making a system of pools and lakes on a larger scale. The ground sloping somewhat toward the stream affords the best conditions for bog and

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moisture-loving plants since the water and water lilies are always seen from above, or looking down upon the flowers. No artificial garden where concrete or masonry is used can afford such ideal spots and margins for such plants as are found in nature's garden. The next best or artificial water garden is similar to that just described excepting that the water supply is artificial and this is all possible, especially where there is a declivity of the ground. Ponds naturally are in the low spots and tanks; pools or artificial ponds should not be built on side hills unless graded to make a perfectly level surface. Suitable planting should be employed here to obliterate the undesirable lines when masonry is used. The top of the wall should be at least two inches be-

low the surface of the soil to allow a sod of grass or other plants to cover and so hide all signs of the masonry.

The next consideration to water supply is the outlet, overflow, etc. In the former case provision against a freshet should be made, for if such happening occurred the whole garden would be destroyed. Where an artificial supply is used this will be unlooked for, but the pond or pools will need an overflow and may need to be drained of the water. Just how this is to be accomplished depends entirely on each particular case. In either case the outlet must needs be near or directly on the bottom of the pond and as circumstances call for. Do not have the overflow in the wall but connected with the outlet. The outlet may

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be regulated with a valve the size of which may depend on the volume of water to be drawn off. To this should be adjusted a stand pipe in two or more sections that will regulate the depth of water in the pond. When required full the stand pipe should be level with the desired surface. This will allow any foreign matter and possibly insects to be washed off the surface if such exist. The supply of water necessary after once filled is nominal, requirement only sufficient to replace what is lost by evaporation. The depth of the pool when finished and ready for planting should be two feet. It may be more, but this affords ample means for an attendant to get in amongst the plants without getting beyond the depth of a pair of ordinary rubber boots.



Eichhornia crassipes major (water hyacinth), one of the most interesting of aquatic plants, with spikes of flowers of a most delicate shade of rosy lilac. In the South it has flourished so luxuriantly as to become a pest

1950

PLANTING AND CARE

I HAVE called attention to soil and boxes for planting, but the matter of planting, the selection of varieties is more or less perplexing and to select from a descriptive catalogue, not knowing the varieties, is equally harassing. In consulting a catalogue one is confronted with hardy varieties, tender varieties, day and night blooming varieties, nelumbiums and Victorias, besides miscellaneous plants.

The hardy varieties are most diverse and care must be taken in selection. They embrace many shades of color except blue, and extremes in size from the

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pygmaea varieties to the gigantic proportions of the *tuberosa* class besides rambling spreading varieties suitable only for large ponds or lakes. These should be omitted from a list of European and hybrid varieties, for if planted in the same pond they will outgrow and smother the medium and small growers. For small and medium sized ponds, omit all the *odorata* and *tuberosa* forms. These are not only strong growers but are seed producing plants which greatly adds to their prolific propagation, and cuts off their flowering season, for invariably when a plant carries a crop of seed it stops flowering. The hybrid varieties do not produce seed and have not a rhizome or running tuberous root. They are however perpetual flowering plants

except in very warm sections in midsummer.

The tender varieties are entirely distinct from the hardy class and are considered superior for several reasons. There are two classes of these — day blooming and night blooming. They furnish the best flowers for cutting, they are larger than the hardy kinds, they grow very rapidly during the summer months and continue in flower until cut down by frost. The flowers are produced on stout stalks often over two feet in length and standing well above the surface of the water, and are extremely fragrant and possess all shades of color save yellow. There are many shades of blue from pale lavender to rich deep purple. These plants are of easy culture.

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Planting should be done the latter end of May to the end of June. The plants are more vigorous than the hardy kinds and require more room and plenty of rich soil. They can be readily wintered in a 'dormant state.

WINTERING

THE tender day-blooming nymphæas that have flowered out-of-doors during the summer are not very easy to carry over winter; the larger the plant the more difficult the task. After a cold spell and the plants are checked in their growth they can be dug up. Cut away the matured leaves, then with a sharp spade cut around the plant about six inches from the crown. This will relieve the plant of a great portion of leaves and roots. Raise the plant and cut off more roots from beneath. Two or three plants may be placed close together in a tub, planted in. Fill between the plants

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with soil and afterwards fill up with water. Place the tub or tubs in a greenhouse or an available light, warm place and in a temperature of sixty degrees. In this case the plants will rest and not die down. It will be useless to attempt to dry them off. This treatment is principally for the day blooming tender varieties. For night blooming nymphæas treat as for tender day blooming varieties with the exception that they have different tubers and when the leaves die off withhold water and allow them to dry and remain so until early spring. To winter hardy varieties that have been grown in tubs and small artificial ponds, sink the tubs in the ground, open a trench 9 to 12 inches deep and of such length to hold six or more tubs. Place a board on

the bottom of the trench to stand the tubs upon. Remove the tubs to the trench and fill in around the tubs with soil to the level and if the soil is higher than the tubs on the outside, so much the better. If plants are in boxes they can be dug up and planted in tubs close together and placed in the trench. Fill the tubs full with water, and after a few frosts and the leaves show evidence of cessation of growth, cover the tubs with boards or such material that they can be covered with a good coating of leaves which can always be secured in fall. In moderate sections such as Philadelphia and New York about a foot of leaves, in depth, over the tubs with salt hay or fresh manure spread lightly on the leaves to keep them from blowing away, will keep

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the plants in perfect condition until the spring. In colder sections the roots can be dug up and buried in the ground eighteen to twenty-four inches deep in sand or sandy soil, covering the surface with leaves. They will keep in excellent condition in such a storage until spring. As to wintering of nelumbiums, they must not be dug in the fall. If in tubs that can not be left in the water; treat as recommended for nymphæas in tubs. If in natural ponds the rhizomes will penetrate the soil, even heavy soil, to a depth of from two to three feet and with two or more feet depth of water it is plainly to be seen they are out of danger of freezing. If in small artificial ponds that will hold water, yet not to any great depth, it would be advisable to cover with



Nymphaea, Mrs. C. W. Ward, a hybrid of *N. gracilis*, is a day-blooming tender variety standing several inches out of the water; of very easy culture and giving an abundance of large fragrant flowers beautiful for cutting



May

boards over same and cover with leaves, hay or manure, of course, where snow is usually heavy. This covering is unequaled, but then again where nelumbiums are grown in a pond that is to be drained in winter, a heavier coating of leaves should be placed over the bed. Where hardy nymphæas and nelumbiums are planted in natural ponds there is no need of any protection as usually there is sufficient depth of water to prevent the plants from freezing.

Nelumbiums, Egyptian lotus, possess an oriental splendor entirely their own. Under proper conditions they can be readily transplanted and when once established are the most beautiful of aquatic flowers, yet many failures are reported. They are very sensitive to

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changes and when the tubers are subjected to changes of temperature, they often get chilled and are very slow to start and if suitable, warm, growing temperature is not apparent in short season the tubers will decay. Transplant in warm weather in a natural or artificial pond when the soil and water is warm and success is certain. The plant when established, forms tubers at the extremities of the root stock which penetrate deep into the soil as if to protect itself from frost. This is done when the ground is not too hard and is often two and three feet below the water. Where the tubers are not so protected they must be otherwise protected as they will not stand any freezing. *V. regia* requires a tropical temperature to grow it at all satis-

factorily and requires artificial heat even out-of-doors in early summer. *V. Trickeri* flowers at an early period and will bloom in a ten-inch pot. These plants require considerable space — one plant would need 300 to 400 square feet of water surface and 25 to 100 cubic feet of soil. Plants can be grown less satisfactorily in smaller spaces, but where space can be given better results are obtained. In growing all kinds of aquatic plants do nothing skimpy or halfway and the results will far surpass one's expectation.

THE END

UNIV. OF MICHIGAN,

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